Denosumab is a more cost-effective treatment alternative in an elderly PMO population. Compared to no treatment, zoledronic acid, and alendronate, denosumab can improve care in elderly PMO patients above 75 years and at the same time lower overall treatment costs in Sweden.

PMS37

ECONOMIC EVALUATION MODEL OF BIOLOGIC THERAPIES FOR MODERATE TO SEVERE PSORIATIC ARTHRITIS IN GERMANY

Wang X[1], Bansback N[1], Anis A[1], Joshi AD[2], Rao S[2], Wolff M[3], Cifaldi M[2]
[1]University of British Columbia, Vancouver, BC, Canada, [2]Abbott Laboratories, Abbott Park, IL, USA, [3]Abbott GmbH & Co. KG, Ludwigshafen, Germany

OBJECTIVES: To determine the cost-effectiveness of biologic drugs for moderate to severe psoriatic arthritis (PsA) using a 40-year German health care perspective. **METHODS:** A network meta-analysis of 8 biologics RCTs determined short-term efficacy using Psoriasis Area and Severity Index 75% (PASI75) and American College of Rheumatology (ACR) responses and Health Assessment Questionnaire (HAQ) and PASI improvements. Published evidence and assumptions were used to predict long-term efficacy using a decision analytic model. Costs included drug acquisition, administration, monitoring, and hospitalisation. Incremental cost-effectiveness ratios (ICERs) were calculated using Quality Adjusted Life Years (QALYs), function (HAQ-adjusted life years), and years in PASI75 response. **RESULTS:** For the QALY analysis, golimumab was extended dominated by adalimumab. The incremental costs and QALYs for adalimumab vs. palliative care were €32046 and 0.671, producing an ICER of €47728/QALY. Etanercept was estimated to provide marginally more QALYs (0.060) at an additional €3461 (ICER of €57380/QALY vs. adalimumab). Although infliximab was estimated to give the most QALYs (0.031 more than etanercept), the cost was an additional €8046 (ICER for infliximab of €260940/QALY vs. etanercept). Results for the HAQ-adjusted life year analysis were similar, where adalimumab (€293/HAQ life year) had similar results in comparison to etanercept (€292/HAQ life year). For years in PASI75 response, etanercept became dominated, golimumab gave 2.308 incremental PASI75 life years at an incremental cost of €29463 (ICER of €12765/PASI75 life year vs. palliative care), adalimumab gave 2.704 incremental PASI75 life years at an incremental cost of €32064 (ICER of €11851/PASI75 life year vs. palliative care), and infliximab became the optimal strategy with 4.407 incremental QALYS at an additional €43553 (ICER of €9883/PASI75 life year vs. palliative care). **CONCLUSIONS:** Using QALYs, which combine the skin and joint aspects of disease, adalimumab and etanercept were the most cost-effective biologic strategies; infliximab gave marginally more benefit at a much higher cost.

PMS38

COST-EFFECTIVENESS OF TAPENTADOL FOR SEVERE CHRONIC NON-CANCER PAIN IN BELGIUM

Obradovic M[1], Ikenberg R[2], Hertel N[3], Liedgens H[1]
[1]Grünenthal GmbH, Aachen, Germany, [2]IMS Health, Munich, Germany, [3]IMS Health, London, UK

OBJECTIVES: To assess the cost-effectiveness of tapentadol prolonged release compared to morphine, oxycodone, hydromorphone, transdermal buprenorphine [TDB], and transdermal fentanyl [TDF] for the treatment of severe chronic non-cancer pain in Belgium. **METHODS:** A one year Markov transition state model with 4-week cycles was built. Four health states were defined: 'no withdrawal and no adverse events treated', 'occurrence of adverse events (AEs) with need for medical treatment', 'withdrawal due to AEs', and 'withdrawal due to lack of efficacy'. Patients who were lacking efficacy or had poor tolerability switched to an alternative 2nd line opioid (oxycodone, morphine, hydromorphone, TDB or TDF). 3rd line therapy was the absorbing state. Data regarding efficacy, tolerability and utility values (EQ-5D) were derived from clinical trials and published literature. Switch rates to 2nd line therapies and resource consumption were estimated by clinical experts. Costs were calculated from the health care payer perspective including patients' co-payments as stated in the Belgium pharmacoeconomic guidelines. One-way, scenario, and probabilistic sensitivity analyses were conducted. **RESULTS:** Compared to oxycodone (direct comparison data), tapentadol had almost the same cost but higher effectiveness, resulting in the incremental cost-effectiveness ratio (ICER) of 6 EUR per QALY gained. The ICERs of tapentadol versus TDB, TDF, hydromorphone and morphine equaled to 2,407, 5,811, 19,852, and 23,182 EUR per QALY gained, respectively. In the univariate sensitivity analysis, resource consumption, probabilities and utilities were varied for ±50%, ±20% and ±10%, respectively. Conclusions about the cost-effectiveness of tapentadol remained robust, especially when compared to oxycodone, TDF and TDB, which account for ca. 90% of the total strong opioid market in Belgium. The ICER in these cases did not exceed 10,000 EUR per QALY gained. **CONCLUSIONS:** To improve pain relief and quality of life in patients with severe chronic pain tapentadol appears to be the favourable and cost-effective treatment option in Belgium.

PMS39

COST-EFFECTIVENESS ANALYSIS OF CERTOLIZUMAB PEGOL IN PATIENTS WITH RHEUMATHOID ARTHRITIS FROM A BRAZILIAN PRIVATE PERSPECTIVE

Piha T[1], Meirelles EDS[2], Kuriki W[3], Miranda PA[1]
[1]AstraZeneca, Cotia, São Paulo, Brazil, [2]HC-FMUSP, Sao Paulo, São Paulo, Brazil, [3]AstraZeneca, Cotia, Brazil

OBJECTIVES: Currently, anti-TNFα monoclonal antibodies are the mainstay of therapy in patients with active rheumatoid arthritis (RA) and inadequate response to methotrexate (MTX) alone. The purpose of this analysis is to evaluate the cost-effectiveness of certolizumab pegol (CZP) versus other anti-TNF (adalimumab[ADA], infliximab [INF] and etanercept [ETA]) as adjunctive therapy to MTX from the perspective of the Brazilian private health care system. **METHODS:** Cost-effectiveness for 52 weeks of treatment was evaluated based on the ACR20 response rate at week 24 based on main published RCTs for each anti- TNF. An indirect comparison was performed using Glenny et al method1. Annual drug costs for each aTNF were calculated from their published ex-factory prices and their recommended dosing schedule in the Brazilian product information. For the calculation of the annual INF cost, the initial weight of the patient assumed for the model was assumed to be 65Kg, with no increment of the doses after 22 weeks. Results are presented in USD (June 11th, 2012 exchange rate) annual costs and incremental cost-effectiveness ratios (ICER's). A sensitivity analysis was made on price discount rate. **RESULTS:** Annual costs were estimated in USD $12,619, USD $39,305, USD $24,267 and USD $35,617 for CZP, ADA, INF and ETA, respectively. Adjusted by indirect comparison of ACR20 response were 77% for CZP and 67%, 61% and 45% for ADA, INF and ETA, respectively. The cost effective ratio was USD $16,484 for CZP and USD $79,742, USD $59,326, USD $40,299 for ETA, ADA and INF respectively. The cost-effectiveness analysis demonstrated that CZP was a dominant strategy compared with ADA, INF and ETA. **CONCLUSIONS:** Certolizumab pegol (CZP) is a cost- saving anti-TNF option for treating RA from a Brazilian private health care perspective.

PMS40

COST-EFFECTIVENESS OF DENOSUMAB FOR THE TREATMENT OF MALE OSTEOPOROSIS (MOP) IN THE ELDERLY IN SWEDEN

Parthan A[1], Deflin MM[1], Agodoa I[2], Tao CY[1], Silverman SL[3], Orwoll E[4]
[1]OptumInsight, Medford, MA, USA, [2]Amgen Inc., Thousand Oaks, CA, USA, [3]Cedars-Sinai Hospital, Beverly Hills, CA, USA, [4]Oregon Health & Science University, Portland, OR, USA

OBJECTIVES: Cost-effectiveness of denosumab versus other treatments in MOP in > 75-year-olds in Sweden was evaluated from a third-party payer perspective. **METHODS:** A lifetime cohort Markov model was developed with seven health states: well, hip fracture, vertebral fracture, other osteoporotic fracture, post hip fracture, post vertebral fracture, and dead. During each cycle, patients could have a fracture, remain healthy, remain in a post fracture state or die. Background fracture risks, mortality rates, persistence rates, utilities, medical and drug costs were derived using published sources. BMD improvements have been shown to be similar across MOP and post-menopausal osteoporotic (PMO) populations; therefore in the absence of well-powered trials evaluating fracture risk reduction in MOP, efficacy was obtained from studies in PMO women. Lifetime expected costs and quality-adjusted life-years (QALYs) were estimated for denosumab, generic alendronate, generic risedronate, ibandronate, zoledronate, strontium ranelate and teriparatide. On average, patients in the model were 78 year-old men, with bone mineral density T-score≈-2.12 and prevalent vertebral fracture of 23%. In the base-case, the model assumed patients could receive treatment effects up to 5 years after discontinuation, except on teriparatide (only 2 years). Costs and QALYs were discounted at 3% annually. Extensive sensitivity analyses were conducted. **RESULTS:** Total lifetime costs for denosumab, alendronate, zoledronate, strontium ranelate, risedronate, ibandronate and teriparatide were €31,324, €34,834, €35,592, €35,939, €36,008, €37,211 and €38,632, respectively. Total QALYs were 5.22, 5.12, 5.15, 5.12, 5.11, 5.09 and 5.19, respectively. Denosumab dominated all treatments by having lower costs and higher QALYs. Denosumab dominated generic alendronate (next least expensive strategy) in the one-way sensitivity analyses also. The probability of denosumab being cost-effective compared to the other treatments at a threshold of €66,000/QALY was 99.0%. **CONCLUSIONS:** Denosumab dominated almost all comparators, including generic bisphosphonates in the Swedish MOP population > 75 years-old.

PMS41

COST-EFFECTIVENESS OF DENOSUMAB IN PREVENTING OSTEOPOROTIC FRACTURES IN POSTMENOPAUSAL WOMEN FROM THE PRIVATE HEALTH CARE SETTING PERSPECTIVE IN BRAZIL

Barbosa EG[1], Machado M[1], Araújo GTBD[2], Etto H[2], Fonseca M[3], Olimpio A[1]
[1]GlaxoSmithKline Ltda, Rio de Janeiro, Rio de Janeiro, Brazil, [2]Axia.Bio, São Paulo, São Paulo, Brazil, [3]Federal University of São Paulo / Axia.Bio Consulting, São Paulo, Brazil

OBJECTIVES: To assess the cost-effectiveness of denosumab and zoledronate in preventing fractures related to osteoporosis in postmenopausal women from the private health care sector perspective in Brazil. **METHODS:** A previously validated Markov model comprising eight health states (no fracture, hip, vertebral, wrist and other osteoporotic fractures, post hip and post vertebral fractures, and death) quantified lifetime costs and benefits within six-month intervals. Analyzed population consisted of postmenopausal women ≥72 years. Age-related risk fracture was modeled and fracture-specific risk reductions of each targeted therapy were computed. Efficacy data were derived from published randomized clinical trials. The analysis included direct costs using ex-factory drug prices. Medical and laboratory costs came from the Brazilian Medical Association reimbursement list. Fracture-related (i.e., hospitalization, surgery) and follow-up (i.e., rehabilitation) costs were extracted from a private health care database (BI2im). Costs were reported in 2012 Brazilian currency (1BRL=0.52USD). Outcomes assessed were 10-year fracture event incidence and quality-adjusted life years (QALYs). Costs and benefits were discounted 5% yearly. Univariate and multivariate (probabilistic) sensitivity analyses tested model robustness. **RESULTS:** Average morbidity costs were BRL2,722 and BRL2,839 for denosumab and zoledronate, respectively. Intervention costs were BRL5,153 for denosumab and BRL5,481 for zoledronate. Lifetime cost difference between alternatives was BRL446 per patient treated. Ten-year fracture incidence was lower with denosumab: reductions of 0.5% and 1.5% for hip and vertebral fractures, respectively, over zoledronate. Average QALYs were 6.861 and 6.841 for denosumab and zoledronate. Denosumab reduced fracture incidence and improved QALYs at a lower cost. Denosumab remained cost-efffective after changes in individual model parameters (up to 20% variability), considering a willingness-to-pay of BRL57,000/QALY gained (3x Brazilian GDP/capita). Multivariate sensitivity

analysis, showed 89.2% of iterations favored denosumab. **CONCLUSIONS:** Denosumab was cost-effective over zoledronate from the private health care setting perspective in Brazil, adding gains in benefits at a lower cost in preventing osteoporotic fractures in postmenopausal women.

PMS42

COST-UTILITY OF TOCILIZUMAB MONOTHERAPY IN METHOTREXATE INTOLERANT/CONTRA-INDICATED, MODERATE/SEVERE RHEUMATOID ARTHRITIS PATIENTS IN PORTUGAL

Monteiro I[1], Cafe A[1], Encarnação R[1], Diamantopoulos A[2], Dejonckheere F[3]
[1]*Roche Farmacêutica Química, Lda., Amadora, Portugal,* [2]*Symmetron Limited, Elstree, Herts, UK,* [3]*F. Hoffmann-La Roche Ltd., Basel, Switzerland*

OBJECTIVES: To explore the cost-utility of adding tocilizumab (TCZ) monotherapy to current monotherapy treatment sequences in moderate/severe adult rheumatoid arthritis (RA) patients with inadequate response to one or more disease-modifying antirheumatic drugs (DMARD-IR) and intolerance/contra-indication to methotrexate (MTX) in Portugal. **METHODS:** A cost-utility analysis was conducted with a societal perspective. The analysis considered two scenarios: a treatment sequence starting with TCZ followed by two tumor necrosis factor inhibitors (anti-TNF), adalimumab (ADA) and etanercept (ETA) and palliative care (PC) - scenario 1 - or ETA, ADA and PC - scenario 2 - compared to the same treatment sequence without TCZ. Patients characteristics (age, starting HAQ-DI score and gender) were based on TCZ randomized clinical trial (RCT) data in monotherapy. ACR response data for the other biologic treatments were sourced from corresponding published RCTs in monotherapy. A mapping model was used to assign QALYs to patients based on HAQ-DI scores and EQ-5D collected in other RCTs (Kremer J, 2008; Smolen JS, 2008). Resource utilization was estimated based on a Portuguese rheumatologists' expert panel. Unit costs were obtained from Portuguese official sources. Costs and QALYs were discounted annually at 5%. Uncertainty around the model key parameters was explored via probabilistic sensitivity analysis (PSA). **RESULTS:** The model estimated that the treatment sequences starting with TCZ result in higher QALYs and additional costs versus comparator sequences. The incremental cost-effectiveness ratios (ICER) in both scenarios is below a threshold of 30.000€ per QALY gained. Sensitivity analysis and PSA showed that results are robust to parameter changes. **CONCLUSIONS:** Results of this analysis suggest that TCZ in monotherapy, added as first line biologic to currently used anti-TNF monotherapy sequences, represents an efficacious and cost-effective alternative to sequences currently used for treating MTX intolerant/contra-indicated RA patients in Portugal.

PMS43

COST-EFFECTIVENESS OF TOCILIZUMAB MONOTHERAPY VERSUS ADALIMUMAB MONOTHERAPY IN THE TREATMENT OF SEVERE ACTIVE RA

Carlson JJ[1], Ogale S[2], Dejonckheere F[3], Sullivan SD[4]
[1]*University of Washington, Seattle, WA, USA,* [2]*Genentech, South San Francisco, CA, USA,* [3]*F. Hoffmann-La Roche Ltd., Basel, Switzerland,* [4]*University of Washington, Seattle , WA, USA*

OBJECTIVES: To estimate the cost-effectiveness of TCZ vs. ADA used as monotherapy (mono) for RA from the U.S. payer perspective. **METHODS:** We compared TCZ (8mg/kg every 4wks) mono vs. two doses of ADA mono: 1) 40mg weekly, 2) 40mg every 2wks. TCZ and ADA every 2wks efficacy was from the ADACTA trial; ADA weekly efficacy was estimated using data from ADACTA and a 2004 van de Putte study. For the 6-month trial period, we calculated incremental cost per additional ACR responder, and low disease activity score (LDAS) achieved for TCZ vs. ADA. We also used a patient-level simulation model to estimate lifetime incremental cost per quality-adjusted life year (QALY) of initiating treatment with TCZ vs. ADA mono; both followed by etanercept-certolizumab-palliative care. Non-responders discontinue at 6 months; responders experience a constant probability of discontinuation thereafter. Discontinued patients go to the next treatment in the sequence. ACR responses are linked to HAQ, which is mapped to utility to estimate QALYs (Diamantopoulos 2012). Costs include drug treatment, monitoring, and direct medical resource utilization (derived from HAQ; Kobelt 1999). Costs and QALYs were discounted at 3%. Sensitivity analyses were performed. **RESULTS:** TCZ 8mg/kg mono had higher ACR responses and QALYs and lower costs compared with ADA mono 40mg weekly. Compared with ADA 40mg every 2wks, the 6-month incremental cost for TCZ ranged from $2,077/additional LDAS achiever to $4,509/additional ACR70 responder; in the lifetime model the ICER was $49,195/QALY. In one-way sensitivity analyses, results were most sensitive to changes in drug costs and ACR responses. **CONCLUSIONS:** TCZ (8mg/kg every 4wks) mono dominates (more effective and less costly) ADA (40mg weekly) mono and is cost-effective compared to ADA (40mg every 2wks) mono, from a US payer perspective, in patients with severe RA for whom methotrexate treatment is not appropriate.

PMS44

COST-EFFECTIVENESS OF ALENDRONATE THERAPY FORCORTICOSTEROID-INDUCED OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS IN JAPAN

Moriwaki K[1], Noto S[1], Inoue H[1], Yanagisawa S[2]
[1]*Niigata University of Health and Welfare, Niigata, Japan,* [2]*Faculty of Pharmaceutical Sciences, Himeji Dokkyo University, Himeji, Japan*

OBJECTIVES: To estimate the cost-effectiveness of alendronate therapy for corticosteroid-induced osteoporosis in postmenopausal women with rheumatoid arthritis in Japan. **METHODS:** A Markov model with six health states (no fracture, post-vertebral fracture, post-hip fracture, post-vertebral and hip fracture, bedridden, and death) was developed to predict lifetime costs and quality-adjusted life years (QALYs) of five years of alendronate therapy versus no anti-osteoporotic therapy in rheumatoid arthritis patients without fracture history. Fracture risk associated with age and bone mineral density (BMD) was derived from epidemiologic studies in Japan. For the base-case analysis, we ran the model with age of 65 and BMD 70% of the young adult mean (YAM). Probabilistic sensitivity analysis was performed to assess parameter uncertainty. **RESULTS:** Compared with no anti-osteoporotic therapy, alendronate therapy cost an additional US$1,255 per person and conferred an additional 0.026 QALYs, resulting in an incremental cost-effectiveness ratio (ICER) of US$48,260 per QALY gained in 65-year-old patient with BMD 70% of YAM. In 70- and 75-year-old women, the ICER were estimated to be US$32,473 and US$20,255 per QALY gained, respectively. Appling a willingness to pay threshold of $60,000 per QALY, the probability of being cost-effective was estimated to 66.2 %, 92.7%, and 99.9% in 65-, 70-, and 75-year-old women with BMD 70% of YAM, respectively. **CONCLUSIONS:** Anti-osteoporotic therapy for corticosteroid-induced osteoporosis in postmenopausal women with rheumatoid arthritis would be cost-effective in terms of Japan health care system.

PMS45

EXERCISE THERAPY, MANUAL THERAPY, OR BOTH, FOR MANAGEMENT OF OSTEOARTHRITIS OF THE HIP OR KNEE: ECONOMIC EVALUATION ALONGSIDE A RANDOMIZED CLINICAL TRIAL

Abbott JH[1], Pinto D[2], Robertson MC[1], T MOA Trial Team[1]
[1]*University of Otago, Dunedin, Otago, New Zealand,* [2]*Northwestern University, Chicago, MI, USA*

OBJECTIVES: There is evidence supporting the effectiveness of both exercise therapy and manual therapy for hip and knee osteoarthritis (OA), but no clinical trials or economic evaluations have been reported of their use alone or in combination compared against usual medical care. **METHODS:** We conducted a cost-utility analysis alongside a randomized controlled trial. Adults meeting the American College of Rheumatology criteria for hip or knee OA were randomly allocated to either: a) exercise therapy; b) manual therapy; c) combined exercise therapy and manual therapy; or d) usual medical care only. Changes in the Western Ontario and McMaster (WOMAC) osteoarthritis index, physical performance measures, quality adjusted life years (QALY), and economic costs (presented in 2009 NZD) were assessed at 12 months, blind to group allocation. Incremental cost-utility ratios (ICER) with 95% CIs and cost-effectiveness acceptability curves were reported, from both health care system and societal perspectives. **RESULTS:** Of 206 participants recruited, 193 (93.2%) were retained at follow-up. Intention-to-treat analysis showed effect sizes for WOMAC score changes at one year compared with the usual care group of 0.53 (Cohen's d; 95% CI .14, .92) for manual therapy alone, 0.32 (-.07, .71) for exercise therapy alone, and 0.31 (-.09, .70) for combined exercise therapy and manual therapy. QALY gain and physical performance test outcomes significantly favoured the exercise therapy group. Exercise therapy resulted in incremental cost-utility ratios regarded as cost-effective at a willingness-to-pay threshold of 2x GDP per-capita, but was not cost saving. Manual therapy was cost saving relative to usual care from the societal perspective. **CONCLUSIONS:** Both exercise physiotherapy and manual physiotherapy, but not combined therapy, provided incremental benefit over usual care alone at one year follow-up. From the perspective of the New Zealand health system, exercise therapy was best value, and from the perspective of society, manual therapy saved costs.

PMS46

ECONOMIC EVALUATION OF ADALIMUMAB FOR THE TREATMENT OF EARLY- AND LATE-STAGE RHEUMATOID ARTHRITIS IN ITALY

Benedict A[1], Kongnakorn T[2], Shaw JW[3], Marcellusi A[4], Vanness DJ[5], Gitto L[4], Giannantoni P[4], Cifaldi M[3], Attinà G[6], Mennini FS[4]
[1]*United BioSource Corporation, Budapest, Hungary,* [2]*United BioSource Corporation, London, UK,* [3]*Abbott Laboratories, Abbott Park, IL, USA,* [4]*University of Rome, Rome, Italy,* [5]*United BioSource Corporation, Bethesda, MD, USA,* [6]*Abbott Italy, Latina, Italy*

OBJECTIVES: The treatment of rheumatoid arthritis (RA) is usually initiated with disease-modifying anti-rheumatic drugs (DMARDs). In patients who do not tolerate or respond to DMARDs, treatment with a biologic agent may be considered. This study aimed to estimate the cost effectiveness of adalimumab+methotrexate (ADA+MTX) relative to standard DMARD therapy for treating early- and late-stage RA in Italy. **METHODS:** Separate discrete event simulations were performed to model the clinical and treatment pathways of early and late RA. Patients' clinical course was modeled as a function of baseline characteristics, treatment efficacy, risks of adverse events, treatment withdrawals, and death. Treatment efficacy was based on American College of Rheumatology (ACR) response, which was translated into Health Assessment Questionnaire (HAQ) scores to facilitate the assignment of costs and utilities. Survival, quality-adjusted life years (QALYs), and direct medical costs were estimated over a lifetime. Inputs of demographics, treatment efficacy, the ACR-HAQ relationship, and utility scores were extracted from several ADA+MTX trials; risks of adverse events, withdrawal rates, prices, and resource use from the literature; and life expectancy from Italian life tables. Assumptions regarding resource use and HAQ progression were consistent with published RA models. **RESULTS:** For early RA, the incremental cost-utility ratio (ICUR) for ADA+MTX over DMARDs-only treatment (after failing two doses of MTX and followed by rescue therapy) was estimated to be €15,770/QALY (3.37 QALYs gained and €53,100 incremental costs). For late-stage RA, the ICUR for ADA+MTX relative to DMARDs only (after failing three doses of MTX and followed by rescue therapy) was estimated to be €20,129/QALY (1.84 QALYs gained, €37,081 incremental costs). Sensitivity analyses indicated that ADA+MTX was cost effective over a range of key parameters. **CONCLUSIONS:** The results of these simulations indicate that treatment of early and late RA with ADA+MTX is cost effective relative to DMARDs-only treatment in an Italian setting.